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Department of Electrical Engineering,  
Queen's University Kingston, Ontario, Canada

## NOTES

<sup>1</sup> Dyad here means a pair of people conversing.

<sup>2</sup> See under Deutsch and Krause (1961) in Bibliography.

<sup>3</sup> Cartoon images were produced by electronically processing television pictures, using 'edge detectors', resulting in a type of line drawing image, resembling hand drawn cartoons.

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C. CHERRY (ED.)  
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AARON V. CICOUREL

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## INTERVIEWING AND MEMORY\*

This paper examines information processing problems associated with decisions made during medical history interviewing, and links the decisions to the use of questionnaires with fixed-choice responses. In medical history interview the physician's summary statement does not reveal the reasoning employed in posing questions and deciding the appropriate answers have been obtained. The use of self-contained stimulus questions with fixed response choices in sample surveys poses a similar problem. In survey research we need to clarify the reasoning attributed to the respondent, and the researcher's decision-making, in arriving at acceptable questions, answers and relationships among stipulated variables. These two strategies for obtaining information do not deal adequately with the emergent conditions of interview settings. The emergent conditions include spontaneous variations in the language used, several levels of semantic information processing, shifting definitions of the problem and a problematic use of stimulus questions. These conditions, seen as natural to all interviewing, will be addressed in this paper.

## I. THE SURVEY RESEARCH MODEL

The decision model used by researchers employing fixed-choice interviews for collecting a data base seeks to correlate the respondent's everyday experiences with independent variables like age, sex, religion, education, and occupation. These variables are said to contribute to the respondent's responses because they organize his recognition of an orientation to his environment. In this survey research model the researcher's theory specifies how the respondent's past experiences and structural characteristics provide for choices from among a special set of alternatives available. The respondent's selections, therefore, are assumed to reflect an internalized value system that is activated by the different consequences attributed to each of the alternatives. Variations in the perception of alternatives and their consequences provide

survey researcher with information about the respondent's values or attitudes and an understanding of group norms. Structural variables of age, sex, parental occupations, education, residence, religion, are said to 'locate' the respondent in the 'social structures.' The variables provide the researcher with a data base for the construction of social indicators to depict the respondent's childhood and adult experiences and orientations to his or her environment.

Two important methodological consequences follow from the survey researcher's use of interviewing. (1) Questionnaires can be used to ask subjects about values and attitudes as expressed in fixed-choice elicitation procedures. (2) Behavioral consequences of the attitudes or values registered by the questionnaire can be imputed to respondents and correlated with structural variables. These correlations can then be linked to characteristics found in the general population as depicted in census and vital-statistics data.

Although the interviewing-questionnaire research strategy presumes a deductive specification of respondent responses and their clustering according to the theoretical assumptions that motivated the questions, few surveys may achieve this ideal. In actual practice new questions, and questions that 'worked' in past studies are used. The questionnaire items that produce significant differences are then linked to theoretical issues, but often in an *ad hoc* manner. The pre-testing of questionnaire items seldom means a restructuring of the general theory, but merely the restatement of a few general hypotheses. Explicit hypotheses are formulated usually after the marginal tabulations have been obtained. An extensive search procedure is employed to generate possibly significant relationships based on the cross-tabulation of different questionnaire items. The persistent discrepancy between the planning of surveys, and their continual *post hoc* analysis, despite ambiguous replications, is seldom attributable to an impoverished theoretical basis for understanding the processing and representation of information in interviews.

Traditional uses of interviewing in social science assume that the problems of obtaining information from respondents can be minimized or eliminated by careful training of interviewers. The standardization of questions and pre-testing of questionnaire items are also cited as safeguards against the idiosyncracies of the interview. Deciding what is an 'appropriate' question and a meaningful 'answer' to the question is antic-

ipated by the use of standardized questions carefully examined during and after pre-tests.

The traditional view of interviewing provides for a logic of questions and answers that standardizes the output or response categories so that cross-tabulations are readily produced. The format is seen as an obvious way to elicit stored information. How stored information is organized and how access is to be made is not defined as a serious problem. The researcher assumes the respondent will be presented with 'normal' speaking intonation, standardized syntactic structures, and standardized topics as indexed by the same lexical items. Open-ended questions that encourage spontaneous responses are not encouraged because this complicates the coding of responses and the achievement of a standardized format.

The organization of stored experiences, however, may require different formats and subroutines for their elicitation. The respondent's monitoring of his or her own output and the interviewer's reactions, providing a feedback that can trigger off other items of stored information that a standardized fixed-choice question can block. Participants usually begin an interview with vague conceptions of what is going to happen. They begin to assume common meanings that emerge implicitly and explicitly over the course of the interview. These emergent meanings provide an implicit working background that can help clarify the participants' questions and answers. This negotiated clarification process occurs in interviewing, including the pre-tests that are part of creating fixed-choice questionnaires. But these negotiated exchanges do not become part of the data base used for making inferences reflected in the medical history summary or survey findings.

The standardized survey questionnaire does not include in its data base interpretations made by participants during the pre-tests or final interview. The standardization of the questionnaire format forces the respondent to find 'appropriateness' in what is offered by the interviewer. Standardization of questions and answers masks how a question triggers off pre-processing and a memory search procedure to decide that the question is appropriate, unclear, not relevant to past experiences, requires further explanation, or is so foolish or annoying that a misleading response is provided.

The use of fixed-choice questionnaires is expedient for obtaining hu-

amounts of information from a sizable sample said to be representative of a larger population. The social scientist sacrifices validity for reliability by seeking information that is amenable to tabular form. The survey format ignores the progressive elaboration of meanings in the encounter. The fixed-choice questionnaire seeks to eliminate the self-conscious accounting that normally takes place after an attempt by one party to elicit information from another person. The fixed-choice format detaches the questions and answers from the original conditions of interaction or experience being addressed, and also divorces the interview setting from how the memory search provides the context within which questions will be understood and answers produced.

The social science survey has formalized some aspects of common linguistic interrogative techniques normally learned by members of some group. The formalization, however, did not emerge after a careful examination of how members of a group normally use interrogative procedures. There have been attempts to link the interview to cognitive studies of how persons process information during all social exchanges (Hyman *et al.*, 1954). But the questionnaire responses are presumed to 'speak for themselves' in the form of tabulated printouts that summarize a sample's attitudes and general knowledge about themselves, objects, events, and others.

The question-answer format is presented as an 'objective' algorithm. This algorithm's success depends on the researcher's careful pre-testing of questions and training of interviewers to find 'appropriate' information possessed by the respondent. The survey research strategy is a weak approach to the elicitation of information from respondents because it contrasts with recent work on information processing, discussed below.

## II. MEMORY AND THE ANSWERING OF QUESTIONS

The study of types of questions that are important in natural languages, where a formal grammar exists, can provide a rough ideal logic of questions of the form where the questioner (Harrah, 1973):

- (a) Is presumed to know what the problem is about.
- (b) Knows how to express the question in an effective manner.
- (c) Knows what the set of possible alternatives can be.

- (d) Can claim that one of the alternatives is true.
- (e) Does not know which alternative he wants to know.
- (f) Believes the respondent can help him if a particular question is put properly.

There are various logics of questions (Harrah, 1973) and they can involve different conditions such as a classroom setting where a teacher puts questions to students and knows the answers expected of students. Or the situation can be a Ph.D. examination (described by Harrah) where the questions put by the examining committee may be designed to help the student or irritate or confuse or attack each other and not the student. The situation can be one where many questions are put to search for a general pattern that would suggest an underlying problem. In the medical field a central nervous system disorder can produce symptoms that may overlap significantly with a serious form of food poisoning or temporary head injury. Hence the sequential order of the questions and answers may not be relevant. In some situations it may be important to match each reply with the question to which it is a reply. Other possibilities include asking another question in response to a question until the questioner is made to clarify his presumed original intention.

In the case of questioning in social-behavioral studies the object is to generate a reply for each preceding question. In the medical interview the questions can come in clusters, to see if a pattern emerges that can be related to several theories about the central nervous system functioning, endocrine balance, enzyme deficiencies, etc. But in all of these cases, including those described by Harrah in his review of the literature, the assumption made is that the conditions of information processing can be held constant or that they are irrelevant to the ideal or standard conditions employed. The model of questioning does not specify the constraints of information processing upon both participants and observer or analyst within or across the use of different sensory modalities.

A recent paper by Norman (in press) suggests several relationships between memory and the answering of questions. He notes that the question may be phrased differently from the storage format needed for retrieving the necessary information (called the 'paraphrase problem'). The 'best' answer to a question may prove to be a question by the respondent to pinpoint what is intended by the original question. Norman is con-

cerned with the pre-processing that occurs before an answer to a question is provided. Hence we need to know something about how people store information, how they combine general information they possess and link it to what is addressed by the question. The reasons or explanations that respondents add to their answers provides some clues about how the question was understood.

Of general interest here is the fact that no simple algorithm can be identified that would specify a sequence of instructions or steps or actions leading to a direct question-answer solution (Norman, *in press*). Norman suggests that the retrieval process is a construction by the respondent because of the paraphrase problem. Short-term memory limitations may influence the retrieval process indirectly because respondents may not be able to parse instructions or questions that are too long and complicated.

The question-answer interview situation can be influenced by such factors as syntactic information, general knowledge of people and of the world, the format in which original experiences are stored, selective attention and memory limitations at the time of receiving the question, dialect differences, and non-verbal information. This list should also include the participants' reflexive monitoring of their own activities, and the emergent and changing atmosphere of the setting. Oral or written representations of the questions and answers invariably require elaboration by the participants to be understood (Cicourel, *in press [a]*). Hence a model of the representation of information in memory presumes there is an expansion of the underlying meanings of actions and concepts (Norman, *in press*). We should not submit open-ended answers immediately to a data reduction process, as is usually the case in social science survey research. But what can we say about questions designed to limit possible responses to a few choices? Presumably the questions have been carefully designed and pre-tested with preliminary samples of respondents to insure their meaningfulness. The use of questions that require fixed-choice responses ignores the information processing problems inherent in all social exchanges. The questions are assumed to be the 'right' questions and properly limited in the choices they provide. Researchers justify the use of this format by the fact that respondents are willing to submit to such procedures.

The logic of questions described by Harrah (1973) does not make problematic the questioner's ability to encode his thoughts or intentions

into language that will be understood by the respondent. Nor is adequate attention paid to the respondent's ability to parse or decode the message, and to link the information so derived to his own knowledge. Similarly, the questioner cannot be assumed to possess an infallible ability to decode the respondent's responses. A basic problem is to decide how much and what types of information we can receive and generate, given the limitations of processing many items of information, and where each item is limited by the number of elements it may contain (Miller, 1956). The kinds of syntactic structures used may place constraints on what information can be processed if the utterances used are long and contain embedded relative clauses that require extra effort to link agent to action to object. The contingencies of information processing are like a moving target. The 'parsers' and emergent meanings used by the questioner and respondent cannot be assumed to be passive aspects of how each will understand the questions and answers.

The physician is often unclear about the patient's medical problems when he enters his interview with the patient. He will often begin to hypothesize about possible alternatives almost immediately. Each hypothesis can trigger off one or more subroutines requiring information retrieval from his own and the patient's memory, thus leading to question-answer sequences that change their course and content sometimes abruptly. The physician obviously believes the patient can help him if different questions are put properly. But considerable negotiation may be required in moving back and forth between the ideas inherent in the physician's questions, and the patient's ability to connect the questions to his own experiences.

The physician's knowledge of medicine will vary depending on the kinds of cases he handles frequently and his possible speciality. A useful analogy exists in chess. The expert or master chess player is able to recognize different 'good' and 'bad' moves more easily than the weak player. There are striking differences in how the expert or the weak player can reconstruct a chess position after only five seconds of exposure to the board (Simon and Barenfeld, 1969; Chase and Simon, 1973). The physician familiar with some speciality will learn to ask questions that index his experiences with certain classes of patients. When the specialist asks questions and receives answers from a patient the reasoning he uses is seldom revealed in a medical history report. Hence not all physicians

using the report would be able to reconstruct the specialist's decision-making strategies in formulating 'appropriate' questions and deciding on 'appropriate' answers.

One way to examine the issues described thus far is to contrast a medical summary and the tape-recorded interview materials generated by an internal medical specialist and his patient. The medical history summary statement suffers from the same problems raised earlier on survey questionnaires. The data bases of each are idealized summary statements that mask the constructed character or reasoning which produces information labelled 'findings.' In the example chosen here the medical history summary statement which I discuss below was dictated by the physician immediately after the interview and was based on his brief written notes and memory of the exchange. (See Appendix I)

### III. ANSWERING QUESTIONS IN A MEDICAL INTERVIEW

The medical summary statement begins with a brief description of the patient's problem of high blood pressure and when it was first noticed. (See Appendix IIA, *The Initial Statement of the Medical History Summary.*) But before we examine the medical history summary, I shall discuss how the physician actually interviewed the patient about her problem.

After the preliminaries of acknowledging the tape-recording of the interview and resolving the fact that the patient did not completely fill out the questionnaire (7-10 in Appendix I), the Interviewer asks (13) *Now just tell me your (slight pause) primary (slight pause) problem that you want us to focus on. What is bothering you at the moment?* The patient's response in (14) refers to the 'primary problem' of what her previous doctor told her, and suggests she is at the office of Dr. X because of the other physician's referral. A variety of terms have been used and assumed by both parties to be 'clear'. Hence in (14) when the patient says: *Well, Dr. B said I had high blood pressure*, the patient is not providing physical symptoms for the interviewer, but seems to be establishing the grounds for the present interview. The patient seems to have ignored the interviewer's remark of *What is bothering you at the moment?*

I assumed that the information contained in (1) through (12) and the first part of (13) is accompanied by the perception of normal appearances and talk that each can treat as unremarkable. I arbitrarily decided to

view the first part of the interview as unremarkable and ignore its content, assuming that the first serious topic for the interviewer began in (13). Notice that this means viewing (1) and (2) as normal greetings and not a serious attempt on the part of the physician to make inquiries into the patient's general health. I knew that the interview took place in the doctor's office and the patient was ostensibly there for medical reasons. I ignored the opening lines of the interview to focus on the contrast between the medical history summary and the details of the interview the summary presumably reflects.

The remarks in (7) on the medical history form implies that each was anticipating the other's remarks and filling in details for the other. The interviewer says *Good (slight pause) great*, in response to (6), and then topicalizes the problem of the history form. He is interrupted by the patient. Neither the patient nor the interviewer demanded an elaboration of the other's remarks, nor did either question the other about their respective actions. The patient's *I haven't* could mean 'I haven't filled it out,' or 'I haven't finished it', etc. The interviewer could have been examining the history form and decided she meant the form was not completed, but that it had been filled out partially. The interviewer's continued remarks *That's alright, I'll go through it with you* implies that he will cover the same ground during his interview and elicit the missing information. The patient's remarks in (10) reveal a general problem of spontaneous oral exchanges. The interviewer and researcher must supply missing details to provide coherence to the remarks by linking it to what is said in (7) and (8). The dialogue seems to follow a neat QAQAQA sequencing order, because our method of representation gives that impression.

Trying to represent the dialogue as I think I heard it after five, ten, and fifteen replays of the recorder is difficult. I am constrained by the sequential ordering that is a built-in feature of our way of writing. If we seek to use a linguistic model constrained by ideal-normative model sentences with an SVO construction, we would have to create grammatical sentences or face serious obstacles to an analysis. My analysis is influenced by the way I transcribe the tape and by tacit reliance on my native competence as a speaker-hearer. There is the additional problem: my careful listening alerts me to details that the participants may have ignored as irrelevant. But then I could ignore details the participants viewed as basic to their understanding of the exchange. Various aspects of their speech

habits are a normal part of their repertoire and may not be designed to communicate anything special in the present setting. The researcher invariably exaggerates the significance of the dialogue by the way he or she represents its content in some organized sequential form, and by the way he or she focuses on particular features of the dialogue.

The interview took place during the first scheduled appointment between the patient and Dr. X. There is no reason to believe that this particular case is not typical of medical interviews. The interview begins (see Appendix I) with an explanation of why the exchange is being tape-recorded. A discussion of the 'immediate problem' follows where it was noted that the patient's blood pressure was found to be elevated during a second pregnancy. The interviewer asks about other symptoms that might be associated with the high blood pressure (21). A discussion of headaches (25) follows. Then the patient mentions her dislike of physicians. There is an attempt to link the headaches with other symptoms, especially visual problems (21-48).

The initial statement of the medical history summary on the 'immediate problem' (Appendix IIA) emerged after about eleven minutes into the interview. There is a discrepancy between the initial paragraph the physician describes as the 'immediate problem' and the actual interview dialogue. Appendix IIA and B reveal how information is condensed into a form that is medically clear but ambiguous as to how the physician reasoned in creating the condensed summary statement. The same problems occur when non-medical interviews are summarized. The first sentence of the summary (Appendix IIA) is *The patient was first told of modest blood pressure elevation at age 31 when she consulted an American physician in Japan for palpitations and chest discomfort*. This observation summarizes the dialogue from (93) to (103). The interviewer (93) asks the patient to delay discussing her present blood pressure condition while he inquires into her past history of blood pressure elevation. Her remarks (94-98) casually refer to *that fellow in Japan*. There is a confusion here about the identity of *that fellow in Japan*. I return to this point below.

The interviewer establishes the patient's age indirectly (101-103) by asking when the examination in Japan occurred. Her present age was established earlier in (33) (see Appendix I). The interviewer expresses surprise (103) at the patient's visit to a doctor because of earlier remarks (40-43) that she didn't like the medical profession and avoided seeing

physicians. He infers that the patient *must have had a complaint then*. The patient describes her problem as ... *I was having pains in, and uh, and you know my heart you know (slight pause) was acting funny....* The interviewer's remarks (105) refers to *Your heart beating fast and you had some chest discomfort*, and this seems to be the basis for the summary statement.

The summary statement makes reference to an 'apparent' relation between the *palpitations* and *emotional stress*. But there is no follow-up in the interview at this time to suggest how the general home situation or patient's emotional status in Japan might have produced the symptoms. The summary statement's references to emotional stress probably stems from several general discussions in later parts of the exchange. Other parts of the summary statement provide brief remarks about the patient's father's hypertension, her family's frequent moves while a child and adolescent, and her frequent moves after marriage to a naval officer. There are additional remarks about a *severe depression* and psychiatric consultations associated with the first pregnancy. All of this information was provided in somewhat fragmented exchanges later in the interview with few details about the nature of the depression.

The reference to *palpitations* being related to *emotional stress* indicates how an interviewer taking a few notes would condense information from several independent items of an exchange to establish an account or explanation of symptoms. Another physician would not know the basis for the observation about the palpitations in Japan.

The reference to a negative EKG is discussed in (106-109) with the patient saying ...*they did one of those, those, things*. The interviewer supplied the term *electrocardiograms*. He then asked ...*what did the doctor say?* (107) and received the reply *He said it looked alright* (108). The patient's *he said it looked alright* is interpreted as a negative EKG (*it looked okay*) (109) in the summary statement.

The reference to phenobarbital in the summary statement is expressed in (108) where it is suggested that the patient was actually seen by two or three physicians. This takes us back to the examination in Japan when the patient said that she could not remember the name of the first physician she was referred to (94-97) (*who was that fellow in Japan?*), the Sunday her husband took her to the hospital. The patient continues to 'code' her experiences in Japan by indicating how she went in for another examination the next day (110) where *everything looked fine. And then I*

went in ... finally decided I'd better have ... and Dr. G. said it was up a little. The blood pressure was found to be elevated again. The reference to the blood pressure being up a little in the summary statement does not reference the fact that the patient returned for a second and perhaps third visit. The patient must have said 'blood pressure' in (110) for the interviewer (111) also said ... Dr. G. he found it to be up a bit. The patient's *no* here in (111) presumably was a response to the interviewer's reference to the patient having seen one physician twice and having the blood pressure taken *once, twice*. The patient's remarks in (110) could be interpreted as her having seen one physician on the initial Sunday. Then she was *told to come back the next day and see somebody else*. Her remarks *everything looked fine, so I sad great forget it* could imply a second visit. The remark *then I went in ... finally decided I'd better have ...* could have been a third visit when Dr. G. said it was up a little bit. The patient seems to clarify the situation in (112) yet the number of visits is not clear nor the circumstances under which the blood pressure was taken. My listening to the tape suggests that the interviewer experienced difficulty (as I did) trying to disentangle the patient's remarks. The problem is not resolved in the following comments (112) because after stressing the conditions for seeing physicians in the military (112 *et seq*) the interviewer shifts the questioning to the first pregnancy and hence leaves the issue unclarified.

The above interview sequences reveal several problems of selective attention and how the contingencies of the exchange influence an interviewer's ability to clarify problems, and record and recall them for a summary statement. The discrepancy between the summary statement and the transcript of the tape-recorded interview reveal that alternate interpretations of fact in the transcript are possible because of confusions in the questioning and frequent use of retrospective formulations. A central problem is how to decide we have obtained accurate information when the interviewing conditions compound the question-answer format. The patient cannot remember details, or she misleads the interviewer in her description. The interviewer can't remember, after each answer, whether he has obtained all the necessary details to establish a clear sequence of events. No interview strategies were attempted that would ask questions according to how the original experiences were stored. The interviewer did not ask the patient to reconstruct the circumstances of the visit in Japan three years earlier by first asking for the season

(summer, fall, winter, spring) to establish the date more accurately. Nor was the patient asked to describe her activities the day before and during the Sunday she asked her husband to take her to the physician. The possible family conditions or personal emotional experiences prior to and on the day of the visit to the physician are not explored. The idea of emotional stress might have been established immediately by the interviewer. Or perhaps the later information about a severe depression in 1964–1965 after the birth of the first child was retrospectively seen as the background for the high blood pressure in Japan in 1969.

At the time of the initial questioning on the high blood pressure there was no hint of a post-partum depression. The information (93–94) on the elevated blood pressure generated antecedent conditions for probing several possible sources of the elevation.

The opening paragraph in the further summary (Appendix IIIA) begins with a remark that modest elevation of *blood pressure during the third trimester of her second pregnancy* occurred. In Appendix IIIB the transcript reveals how the information was obtained. The interviewer in (13) asks for information on the *primary problem* and receives a response (14) indicating high blood pressure. The sequence (15–20) provides information that would establish the high blood pressure in the third trimester (*two and a half months before the June delivery date*).

The second sentence of the opening paragraph of the further summary statement (Appendix IIIA) reports a date of *about April 22nd* as the time when *the patient experienced intermittent episodes of visual disturbance characterized as 'dust' appearing in her visual field*. The transcript (21–24 in Appendix IIIC) establishes the appearance of *dust* in the visual field, but in (24) the patient reveals she should be wearing glasses but avoids wearing them *because I have a small nose and they're down here constantly*. When the interviewer (21) asks about symptoms associated with the high blood pressure at the time of her second pregnancy, the patient mentions the appearance of *dust*. The patient volunteers information about her wearing glasses. The interviewer may have reasoned that the high blood pressure but not the problem of not wearing her glasses would be linked to the appearance of *dust*. Then in (25) he asks about *headaches, for example*. This could be seen as a continuation of (21) and (23), or as an attempt to link her headaches to her not wearing the glasses. Here we have to know how the interviewer's knowledge of clinical medicine may

have ruled out several hypotheses and confirmed others. The interviewer does not have an indefinite amount of time and may have reasoned that the remark about not wearing glasses is not significant unless there are persistent headaches. Such uncovering of a history of hypertension and a postpartum depression later in the interview may have convinced the interviewer retrospectively that the glasses not being worn was not a central problem.

The question about headaches (25) seems to be a follow-up of the patient's reporting not wearing her glasses, but this connection seems to be dropped after the patient refers to having a *tension headache right now*. The further summary statement (Appendix IIIA) contains a few remarks in a separate paragraph on this problem. The patient defines her headaches as a *tension headache* in the transcript (26) and as appearing *when I menstruate or just before my period* (32). The summary statement refers to the headaches as being *related to tension and also the onset of her menses*. The remarks in the medical history summary reflect a condensed and organized version of the transcript details (31–40). The details do not reveal the negotiation (35–40) between interviewer and patient on the frequency of the headaches. The headaches are not related to the non-wearing of glasses, but there is an attempt to explore the possibility of migraine conditions when the interviewer asks (43) about the headaches being associated with getting *sick to your stomach*? The interviewer's notes may have reflected (26) and (32), thus linking the headaches to the hypertension. The patient tries to dismiss the headaches (34) and this may have influenced the interviewer's interpretation of them as, in part, due to her not wearing glasses. Yet in (43) the interviewer asks if the headaches are associated with seeing *double or do you have blurring of vision*?

When we contrast the summary statement with the transcript we are making a second guess at the way the interviewer may have pursued unstated hypotheses about the patient's problems and what might be associated with her referral 'for evaluation of hypertension'. My second-guessing reveals how the researcher's limitations are similar to those of the interviewer's. The researcher and interviewer are constrained by similar cognitive and linguistic or conversational elements in their construction of accounts of 'what happened'. What is important are the shifts in questioning contained in the transcript and the glosses in the summary statement that make clear ways in which the interviewer

processed information during and immediately after the interview. The summary statement reveals specific interpretations that do not reflect the equivocality of the transcript. But the summary does show how data reduction after the fact can produce appropriate medical categories. The categories permit the physician to prescribe a course of treatment and also becomes part of a medical record to facilitate decision-making by other physicians. The summary is also a legal document that indexes the application of medical knowledge, but does not permit a reconstruction of the contingencies of the interview.

The interviewer's knowledge of different topics (in this case medicine), and understanding of the patient's talk, creates evidence for deciding what to infer from various answers, and when enough information has been obtained to stop one line of questioning and to shift to a new topic.

The medical interviewer followed an implicit outline based on his experience with patients presenting themselves with 'high blood pressure'. His interviewing includes tacit observations of the patient's affect, physical appearance, movement, and use of language. There is a simultaneous concern with formulating questions that would elicit various types of information about the reason for referral. Meanwhile, as new information is received, details are being processed to generate possible new questions that would clarify problems already discussed. As information is received and processed, present details are related to prior particulars, or are recognized as having possible significance for an independent line of questioning.

The inferences that are made in the course of the interview must link present information to aspects of one's memory. The earlier details may be subjected to further elaboration depending on what follows. This abductive reasoning (Peirce, 1957), retrospectively linking consequent conditions to antecedent information, is a basic feature of all socially organized communication. Depending on the answers to some questions, others emerge as relevant, and the interviewer or respondent must assess the significance of information while continually asking further questions that may be related to an over-all pattern. The interviewer's (correspondent's) thinking about the significance of past answers can lead to questions about unstated hypotheses formulated during the interview.

Our ability, as interviewer or respondent, to comprehend two simultaneous messages can be attenuated if we divide our attention equally



between the messages. Attending to several informational modalities and trying to sustain a dialogue that satisfies what we think of as 'normal discourse' means a steady flow of speech acts that do not contain 'long' pauses, 'frequent' hesitations, and incoherent use of lexical items. It is difficult to simulate this idea of 'normal discourse', by presenting a written transcript, but a few minutes of an audio tape can be quite convincing that someone's speech is 'bizarre'.

Several levels of information processing occur in an interview. These levels require us to shift back and forth between different informational sources while we link selected particulars to retrieved information in long-term memory. We may shift our attention from the patient's appearance or movement or voice intonation, to the content of what is being said. Or, we may note the possible significance of what is being presented by contrasting the information with prior details or some vague or general idea of an immediate or underlying problem. These numerous and continuous shifts in attention interact with our memory but may be recorded only minimally in the form of cryptic notes. Our notes can provide us with truncated descriptions designed to capture significant details, or with analytic remarks that mask the details we paid attention to.

The medical interview clarifies uses of interviews and questionnaires in social-behavioral science. The medical interviewer must negotiate a difficult interface between basic (and clinical) science concepts and vocabularies and common sense conceptions and terms dealing with illness and biological causality. The medical interviewer cannot 'pre-test' nor standardize his questions. The most experienced medical interviewer cannot escape the contingencies associated with a broad range of patients from different cultural backgrounds. The medical interviewer is seldom trained to deal with the contrast between the questions used and the common sense reasoning and language employed by both physician and patient. The emergent problems associated with linking medical-biological and common sense theoretical perspectives on health and pathology provide a natural laboratory for understanding the information processing parameters of everyday decision-making.

The structured interview or fixed-choice questionnaire attempts to minimize the information-processing difficulties associated with medical interviews. The attempt to minimize the difficulties of such face-to-face exchanges provides findings that are said to be 'objective'. But the struc-

tured interview or questionnaire achieves its 'objectivity' by employing an ambiguous model of language use and information processing. This model legislates the interface between questions and the respondent's responses instead of exposing the interface to careful study.

#### IV. THEORETICAL DISCUSSION

Non-verbal communication will not be considered in this paper. The data base consists of a tape-recorded interview and this was felt to be inadequate for a discussion of non-verbal activities (Cicourel, in press [b]). In our use of the interview we often forget that we can attend simultaneously to multiple sources of information that can be processed selectively at different levels of analysis. We usually represent our thoughts, feelings, and intentions through a verbal mode of communication that cannot recover the complexity of our experiences nor the complexity of the setting. To clarify the complex interaction that occurs in interviews we must understand something about how verbal communication filters different experiences.

The linguist views language as bounded utterances whose internal structure can be described by clearly identifiable rules. He refers to syntactic and phonological rules, and to the idea of a lexicon. In the lexicon each item or entry possesses a phonological matrix as well as inherent and contextual features that can specify the item as animate or abstract, and, for example, whether it follows a definite or indefinite article. This model provides the linguist with carefully constructed ideals that can be studied and described independently of actual language use in social settings.

The linguist's syntax-based theory of language provides the ideal structures needed to construct standardized questionnaires. The linguist's normative theory of language describes prescriptive and proscriptive rules or practices. Such practices are like recipes for deciding what is socially acceptable and unacceptable behavior. The language of the medical history summary and survey questions achieve their limited objectivity by relying on idealized language structures. The linguist's idealized grammatical and phonological rules, and standardized dictionary, however, are not helpful in the study of actual language use in interview settings, i.e., specific utterances.

An understanding of decision-making activities in interviews requires that we look beyond the linguist's model. Research on the interview as an information processing activity suggests that the human organism processes information using both a 'filter model' and something like analysis-by-synthesis (Broadbent, 1958; Neisser, 1967; Norman, 1969). The filter model seeks to explain the limitations of our ability to perceive competing messages by reference to perceptual factors. The brain is seen as capable of filter operations that are oriented to accepting some message while rejecting others considered 'undesirable' or perhaps not receivable. The differential reception of some signals through the filtering operations that result in further processing is not clearly understood. Presumably information from a channel to which the organism is 'tuned', despite the exposure to other channels, is processed further, remembered and used as a basis for a response. Challenges to this notion (Moray, 1959; Tricsman, 1960; Gray and Wedderburn, 1960) have noted that there are psychological features associated with attention and not just physical characteristics, and that the content of a rejected message does leave an impression on the subject depending on the content of the rejected message and how it is presented to the subject. Material submitted to the 'wrong' ear produced a response from the subject. The information received by both ears will reach the same perceptual and discriminatory mechanisms involved (Deutsch and Deutsch, 1963). Sensory cues alone were found to be inadequate to explain the kind of selection going on when subjects receive information from several channels.

Modern linguistic theory does not address language competence and performance by reference to the above information processing activities. Hence whatever is called the comprehension of utterances requires extending the linguistic model to include explicit cognitive processes. Complex information processing goes on in selecting different channels and every incoming signal receives some kind of selective attention vis-à-vis its meaning by reference to memory storage and the sensory features of the incoming signals. Therefore, we must specify some of the complexities of attending to information whilst recognizing that we are capable of simultaneously generating several types of informational particulars.

Linguistic theory recognizes but does not address the fact that we make tacit use of information from visual and other sources when speaking, including thinking processes that enable us to expand utterance frag-

ments into meaningful items because of culturally organized memory. This is not a matter of simple pattern recognition whereby the linguist could claim that sound patterns are organized by immediate and underlying rules in the act of reception. The shortcomings of any simple pattern match theory of reception can be clarified by examining the effects of context on the interpretation of letters, sentences, and visual appearances, where the same physical signals are interpreted quite differently when different surrounding contexts are introduced. Kolars and Pomerantz (1971) note that adult subjects create moving visual illusions from stationary stimuli that cannot be explained by *gestalt* principles or feature analysis extraction. Thus the contour of the stimuli are not primary, nor is any set of features said to index the stimuli presented. The interpretation of visual stimulus conditions seems to begin with a response to movement and is followed by the creation of recognizable patterns. The visual system is said to supplement inputs to it through cognitive organization and reorganization.

The processing of information seems to occur at several levels simultaneously despite the fact that our representation of what we are thinking, feeling, or perceiving is being channeled into a verbal coding that is oral and/or written and thus linear. This coding does not adequately represent the information we experience, but what we experience at different levels is important for what we say next to each other because our talk relies on this assumption.

The psychological model is not clear about how such cognitive processes are articulated with culture meanings that are negotiated in the setting. The processing presupposes that a pair of speaker-hearers are responding in a 'normal' way to informational particulars that can be seen as 'familiar' or 'normal' forms of everyday representations. But speaker-hearers must negotiate the discrepancy between what they may have stored in memory about substantive qualities of the everyday world and the variety of informational particulars available to their senses during social exchanges.

Multiple sources of information processed by different modalities limit what we learn in an interview. The limitations of cross modal information processing is especially difficult when we must rely on non-verbal communication. We have no way of discussing non-verbal communication (Cicourel in press [b]). What is at issue is the organism's ability to execute

many disconnected conceptual processes simultaneously. Several points should be noted. (1) The difficulty of the tasks involved. (2) The number of events the subject can attend to and follow. (3) The respondent's ability to retain and retrieve variable amounts and types of information. (4) The subject's ability to organize and store experiences as socially meaningful chunks of information that can be accessed by reference to the original conditions of the experiences.

#### V. CONCLUSION

Traditional surveys with fixed-choice questions provide the respondent with a predigested decision process. After trial and error pre-tests with small samples of a population, questions are derived that are viewed as 'meaningful' to the larger representative target sample; the researcher has presumably narrowed the alternatives such that the questions are meaningful to the respondent's everyday experiences and faithful to the researcher's theory and hypotheses. The fixed-choice questionnaire is like the physician's medical history summary statement; the decision processes are not revealed to provide an independent reader with clues about its construction. The details of the decision processes that would clarify the reasoning on the part of the physician, and the reasoning attributed to the patient's answers, are not discernable to the reader. Survey questionnaires exhibit rather similar problems. Both procedures obscure the data base used for an analysis of the findings, or for justifying a suggested course of treatment or policy recommendations.

The survey researcher justifies his analysis of the coded responses by treating the interview problems as technical issues that can be resolved by interviewer training and standardized questions carefully formulated after one or more pre-tests. No information processing problem exists in this model of questions and answers. The physician assigns even less significance to interviewer training problems, despite devoting little time to formal monitoring of the kinds of questions formulated and the types of answers received from different patients. The physician relies on powerful theories from biology, biochemistry and the neuro-sciences to justify his diagnosis and treatment; he tends to ignore the difficult interface between the common sense talk to the patient, and the translation of the question-answer format into clinical science terms.

During interviewing we become aware of the general appearance of the respondent and the immediate informational particulars of what is being said by each party. The interviewer may simultaneously write things down, follow up a particular item, notice the next item, probe something the respondent has said, etc. Our attention may switch to objects in the setting and the movements the participant exhibits. Various features of the respondent may be noticed such as excessive perspiration, changes in skin color or texture, facial expressions, etc. These features may be noticed but not indexed in notes taken. The unrecorded information, however, can affect what is said next or at some later point in the interview, and may or may not be articulated with routine questions, or with the existing topic. Meanwhile, something like the prepossessing of a subroutine takes place while more formal questions are asked. These subroutines can lead to a preliminary diagnosis, additional unplanned questions, and a restructuring of subsequent parts of the interview. The summary statements of a medical history, therefore, selectively integrate various sources and types of information. The selective integration or processing during the interview is the basis for different question-answer subroutines, and produces condensed accounts or explanations that find their way into the medical history summary.

Fixed-choice questionnaire items seek to anticipate the natural processing of information that occurs in medical or similar interviews. This is done by forcing the respondents' experiences into a format that facilitates the analysis of coded responses. The analysis appears to be an obvious and straightforward cross-tabulation procedure involving different variables. The analysis implies an algorithm that contradicts the way humans normally receive and process questions and formulate possible answers. The survey researcher, therefore, ignores the ways humans normally ask questions and recognize appropriate answers in different cultural settings, treating the information processing activities as unremarkable.

In this paper I have tried to show how cognitive and linguistic or conversational elements are basic to the researcher's description of decision-making processes in interviews. These decision-making processes are of interest because their study helps to reveal some of the basic features that are associated with the prediction and interpretation of accounts in everyday life. Medical history interviewing was used to illustrate how

medical knowledge glosses are produced. These glosses are based on the physician's brief written notes and his memory of the event. Details from a tape-recorded transcript was presented to illustrate how extensive information processing is used to negotiate the construction of a summary statement. The summary statement provides medical documentation for present and future treatment. The question-answer interview format used by the physician with a patient suggests how we can understand claims to knowledge that depend on the common sense reasoning inherent in this format.

University of California, San Diego

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## APPENDIX

### I

#### Dr. X's Interview

(I = Interviewer, P = Patient)

- (1) I: (unclear) How are you?
- (2) P: Fine, thank you.
- (3) I: I'm Dr. Huntley [as door is closed] and uh thanks for [slight laugh] undergoing your first interview. [sounds as if patient may have mumbled a low-keyed acknowledgment] (pause) Aas you know, uh and we're going to re (slight pause) record this one because we're trying to get better ways of getting medical facts from patients (pause) in order to (slight pause) maybe get a more systematized approach to medical interview.
- (4) P: Allright.
- (5) I: So we get more information and consequently help you and other patients, better [P: low mumble like 'mmh'] and also we're teaching medical students how to talk to (slight pause) patients, so this is helpful too. That okay with you?
- (6) P: Yes, that's fine [in low voice that sounds quite 'agreeable']
- (7) I: Good (slight pause) great. (pause) Now let me have the history form you filled out.
- (8) P: ↑ I haven't
- (9) I: That's alright, I'll go through it with you.
- (10) P: And, yah, because some of them, you know, I put a question mark beside them, cause I'm [I: 'yah'] you know (pause)
- (11) I: Why don't you just sit over there, I can talk to you better.

- (12) P: <sup>↑</sup>You like this one better [patient mumbling something here.]
- (13) I: Get a big pillow (pause, movement of objects heard) get out of the sun. Now just tell me your (slight pause) primary (slight pause) problem that you want us to focus on. What is bothering you at the moment?
- (14) P: Well, Dr. B said I had high blood pressure. (pause)
- (15) I: And this was just uh found routinely, uh [P: 'Well'] in the course of an exam (book?) [patient tries to say something like 'I was pregnant'.] made to see Dr. B (slight pause) [patient and Dr. talking simultaneously here] You were pregnant.
- (16) P: That started it. I guess they thought it would go down (slight pause) and uh (pause) it didn't.
- (17) I: Now when was this first discovered? When were you pregnant?
- (18) P: Well, I delivered in uh, uh, in June. (pause) I'd say. [I: 'okay' said faintly.] I would say maybe, (slight pause) two and a half months before.
- (19) I: Two and a half months before or so perhaps [barely audible here] sometime (unclear) in uh, uh time in March. And [cut off by patient]
- (20) P: Ohh about April [mumble afterwards]
- (21) I: About April [P: mumbles something that from the tone of voice sounds like agreement] Were you having any symptoms from high blood pressure? (pause) Did you feel any different (slight pause) other than having the pregnancy?
- (22) P: Uhh (long pause) you know it looks like dust sometimes.
- (23) I: I see. In other words, [patient starts to speak and stops] Your, your vision isn't as clear as it should be.
- (24) P: Well (pause) you see, this, now this is (pause) uhmm (slight pause) a little, (pause) [sounds hesitant here] I'm supposed to wear glasses. [I: 'yeah' said at same time as patient's next word]

- alright? And I have [pause] Uh, and I'ya (slight pause) just don't like to wear them because I have a small nose and they're down here constantly. (slight pause) I have [I: 'I see'] an oily complexion and all the rest. [I: 'mmh huh'] and uh (slight pause) they just don't work out. [the patient is sort of half laughing here and her manner of speaking is inarticulate.] So [laughs] (?) wearing them (?)
- (25) I: Did you ever have any headaches, for example?
- (26) P: Uh, I have occasional headaches, like I have a tension headache right now. [laughs here while saying something] (?) when (?) [since?] your secretary called yesterday.
- (27) I: They all do, it's late in the afternoon.
- (28) P: <sup>↑</sup>It started, you know. It started. So uh [cut off by interviewer]
- (29) I: What are the tension headaches like, (slight pause) what (slight pause) part of your scalp?
- (30) P: <sup>↑</sup>Like this, it hurts right over here.
- (31) I: I see, over the right eye.
- (32) P: Well, yes, this one (slight pause) feels [mumble by interviewer] yeah, but uh, (pause) and I, I, (slight pause) I happen [sounds like 'have'] to have them when my, when I menstruate or just before my period, or something. And this is what this one is like.
- (33) I: You're how old now? 34? (P: '34' said simultaneously with interviewer) How long have you been having headaches of this sort?
- (34) P: I don't have them anymore.
- (35) I: Just occasionally? [faint something from patient that sounds like agreement] Every how often? (pause) one a month, once [patient cuts in]
- (36) P: Not even once a month. (slight pause) I (long pause)

- (37) I: Perhaps every once every two or three months (then uh ?) (pause)
- (38) P: You know, [interviewer: 'frequency or?'] well [well] let's say once every three months.
- (39) I: Okay. [patient: 'Uhhh'] is it relieved by any medication? (slight pause) You, you take anything?
- (40) P: <sup>↑</sup>I take an aspirin sometimes (slight pause) that helps, and sometimes a dozen fails. Uhh, (slight pause) I'm not uh, I'm just about the opposite of other people (?) I don't like to see doctors. *Really* [interviewer: 'now don't scare me now' (?)] I don't, just don't like your profession [interviewer, with rising voice: 'Okay'] (pause) I'm just giving you fair warning.
- (41) I: Right. I think people should stay away from doctors [laughs] (slight pause) unless it's absolutely essential. I couldn't agree with you more.
- (42) P: Uh like I don't go in for pap smears when I'm supposed to (unclear) so do you? (?) I get extremely nervous about it. And I'm sure it upsets you, it's (?) my high blood pressure.
- (43) I: Alright, I wouldn't be surprised. Since that's a (pause) common thing when people go to doctors, and when doctors go to doctors the same thing happens to them. [P: 'Does it?'] [Now they both talk simultaneously but the patient's remarks are not clear.] Oh sure their blood pressure goes up. [patient says something about 'a dentist friend who has high blood pressure' (pause) 'We're all (pause) basically human, you know'.] Now, (slight pause) when you have your headaches do you get sick to your stomach? [(pause) P: 'No'] (I think he says) that doesn't seem to be your problem. Okay, is your visual problem worse at the time? When you have your headaches (pause) do you see double or do you have blurring of vision?
- (44) P: I've never had blurring I just, (slight pause) now when I was pregnant I did see those uhm white stars [I: 'I see'] you know

- and I saw them one time I believe (said rather haltingly) and I've been looking for them then (slight pause) one time since I delivered and it was right soon after I had the baby (pause) but I haven't seen them I just see these little black, fuzzy looking things. Now whether it is due because I don't wear glasses or my eyes [interviewer breaks in] [can't understand patient] <sup>↑</sup>
- (45) I: You mean you're even seeing them now or did they go away with each (patient breaks in)
- (46) P: Oh, I see them occasionally [I: 'delivery'] (pause) yes uh [I: 'Okay'] sometimes I see them during the day, like I saw (slight pause) a couple this morning [I: 'mmh uhm'] but then right now I don't see any, and I'm looking for them and I don't see them.
- (47) I: In both the right and left eye?
- (48) P: More the left. [very long pause] [interviewer probably writing] [interviewer sort of coughs or clears throat]
- (49) I: Now have you, do you have any idea how high your blood pressure levels were when Dr. B [patient interrupts here]
- (50) P: <sup>↑</sup>Oh, I know what it was the last time.
- (51) I: What was it the last time?
- (52) P: I believe he said 170 over 100.
- (53) I: Okay, (slight pause) and when was that approximately? [P: 'hm'] This was after delivery or (interviewer mumbled something)
- (54) P: Yeah, (slight pause) now this was (pause) the last visit I (pause) yeah, (slight pause) this was approximately a month ago.
- (55) I: Okay, that's (slight pause) just fine, some time in July, just fine. Now (slight pause) how was the pregnancy, was it a routine pregnancy, was that your first or what number was it?

## II

A. *The Initial Statement of the Medical History Summary*

**Immediate Problem.** The patient was first told of modest blood pressure elevation at age 31 when she consulted an American physician in Japan for palpitations and chest discomfort. Apparently the palpitations were related to emotional stress. An EKG was negative. Phenobarbital was prescribed. The physician noted that her blood pressure was 'up a little'.

B. *The Interview Dialogue upon which the Summary (IIA) Was Based*

- (93) I: Okay, now in terms of your blood pressure, uh, before you get back to that again, uh were you at any time in the past aware that your blood pressure was modestly elevated? Did any doctor tell you
- (94) P: Just that (slight pause) fellow in Japan and he just didn't seem
- (95) I: <sup>↑</sup>during an exam
- (96) P: to (?)
- (97) I: <sup>↑</sup>When was that, who was that fellow in Japan?
- (98) P: Dr. G (patient and interviewer laugh)
- (99) I: Your husband is in the military I gather.
- (100) P: Yes, you know why (I: 'yeah') I uh, I, I thought you already asked me that because I (I: 'Right', (laughs slightly) because (?) the girl in the other room asked me the same thing, I don't know his name (laughing) either.
- (101) I: When were you, how old were you uh (pause) when you were in Japan? When you were in Japan at that time.
- (102) P: (mumbling and unclear initially) I'd say three years ago.
- (103) I: Okay, so you were about age 31, and uh, did you go on a routine (slight pause) check, but you don't go to doctors routinely. [P: 'no'] you must have had a complaint then. Why did you see Dr. G?

- (104) P: <sup>↑</sup>I did, I went in one Sunday afternoon because I felt like I was having pains in, and uh, and you know my heart, you know, (slight pause) was acting funny, so I had my husband take me in.
- (105) I: Your heart was beating fast [P: 'yeah, and']  
<sup>↑</sup>And you had some chest discomfort.
- (106) P: So they did one of those (slight pause) those, things [I: 'electrocardiograms'] I believe (slight pause) with a little (pause) [unclear term] things like this.
- (107) I: Right, and what did the doctor say?
- (108) P: He said it looked alright.
- (109) I: It looked okay.
- (110) P: But he put me on uh (pause) phenobarbital; told me to come back the next day to see (pause) somebody else, [I: 'right'] general fellow and I went in and everything looked fine, so I said great forget it, you know (slight pause) and then I went in (slight pause) finally decided I'd better have (pause) [I: 'yeah'] (laughing here and unintelligible) and Dr. G. said it was up a little bit. (I: 'The uh' [cut off]) But he didn't say (hesitating here) that was all (pause) it was up a little bit.
- (111) I: So once, twice when you saw Dr. G he found it to be (slight hesitation) up a little bit [P: 'no'] is that correct? or just the second time?
- (112) P: <sup>↑</sup>The first time I didn't see, yeah, I didn't see G the first time, (I: 'okay') I saw, just (slight pause) whoever was there, you know. Well, have you ever been in the Navy?

## III

A. *A Further Statement of the Medical History Summary*

The patient was found to have modest elevation of blood pressure during

the third trimester of her second pregnancy, which terminated 6/30/72 with normal delivery. During the third trimester of this pregnancy, or beginning about April 22nd, she had intermittent episodes of visual disturbance characterized as 'dust' appearing in the visual field. She described a fuzziness and occasional 'stars' flashing in the visual field. Such episodes are intermittent and brief in duration. At no time did she have difficulty focusing, scotomata, or double vision. No cardiorespiratory, renal problems, or evidence of eclampsia complicated the last pregnancy. In the post-partum check, she was still found to be modestly hypertensive, the last check being in July of '72, at which time the BP was in the range of 170/70.

*Headaches:* For several years, probably longer, she has been subjected to recurrent headaches. These are related to tension and also the onset of her menses. These take the form of a dull discomfort, usually over one or the other eye in the frontal region and are readily relieved with aspirin; duration 1-2 hours. No associated photophobia, nausea, vomiting. These are not in the migraine pattern.

*B. The Interview Dialogue upon which the Summary (III A) Was Based*

- (11) I: Why don't you just sit over there, I can talk to you better.
- (12) P: <sup>↑</sup>You like this one better [patient mumbling something here.]
- (13) I: Get a big pillow (pause, movement of objects heard) get out of the sun. Now just tell me your (slight pause) primary (slight pause) problem that you want us to focus on. What is bothering you at the moment?
- (14) P: Well, Dr. B said I had high blood pressure. (pause)
- (15) I: And this was just uh found routinely, uh [P: 'Well'] in the course of an exam (book?) [patient tries to say something like 'I was pregnant'.] made to see Dr. B (slight pause) [patient and Dr. talking simultaneously here] You were pregnant.
- (16) P: That started it. I guess they thought it would go down (slight pause) and uh (pause) it didn't.

- (17) I: Now when was this first discovered? When were you pregnant?
- (18) P: Well, I delivered in uh, uh, in June. (pause) I'd say. [I: 'okay' said faintly.] I would say maybe, (slight pause) two and a half months before.
- (19) I: Two and a half months before or so perhaps [barely audible here] sometime (unclear) in uh, uh time in March. And [cut off by patient]
- (20) P: Ohh about April [mumble afterwards]

*C. Further Dialogue Used for the Summary (III A)*

- (21) I: About April [P: mumbles something that from the tone of voice sounds like agreement] Were you having any symptoms from high blood pressure? (pause) Did you feel any different (slight pause) other than having the pregnancy?
- (22) P: Uhh (long pause) you know it looks like dust sometimes.
- (23) I: I see. In other words, [patient starts to speak and stops] Your, your vision isn't as clear as it should be.
- (24) P: Well (pause) you see, this, now this is (pause) uhmm (slight pause) a little, (pause) [sounds hesitant here] I'm supposed to wear glasses. [I: 'yeah' said at same time as patient's next word] alright? And I have [pause] uh, and I ya (slight pause) just don't like to wear them because I have a small nose and they're down here constantly. (slight pause) I have [I: 'I see'] an oily complexion and all the rest. [I: 'mmh huh'] and uh (slight pause) they just don't work out. [the patient is sort of half laughing here and her manner of speaking is inarticulate.] So [laughs] (?) wearing them (?)
- (25) I: Did you ever have any headaches, for example?

*D. Further Dialogue Used for the Summary (III A)*

- (26) P: Uh, I have occasional headaches, like I have a tension headache right now. [laughs here while saying something] (?) when (?) [since?] your secretary called yesterday.



- (27) I: They all do, it's late in the afternoon.
- (28) P: <sup>↑</sup>It started, you know. It started. So uh [cut off  
by interviewer]
- (29) I: What are the tension headaches like, (slight pause) what (slight  
pause) part of your scalp?
- (30) P: <sup>↑</sup>Like this, it hurts right over here.
- (31) I: I see, over the right eye.
- (32) P: Well, yes, this one (slight pause) feels [mumbles by interviewer]  
yeah, but uh, (pause) and I, I, (slight pause) I happen [sounds  
like 'have'] to have them when my, when I menstruate or just  
before my period, or something. And this is what this one is  
like.
- (33) I: You're how old now? 34? (P: '34' said simultaneously with  
interviewer) How long have you been having headaches of this  
sort?
- (34) P: I don't have them anymore.

## FIFTY-TWO OPPOSITIONS BETWEEN SCIENTIFIC AND POETIC COMMUNICATION

Scientific and poetic communication are two forms of a more general type of human communication, belonging to the family of languages of discovery. So, there are many common features between them. This is just the reason why it is interesting to investigate the differences, the oppositions between these two types of communication. Trubetzkoy has pointed out that oppositions between relatively similar things are more interesting than oppositions between completely different things [27]. So, in English it is more interesting to study the opposition between the phonemes *s* and *z*, which are similar except for one feature (nonvoiced-voiced) than the opposition between *s* and *n*, which differ with respect to several features (strident-nonstrident, nonnasal-nasal, continuant-noncontinuant, nonvoiced-voiced).

We deal in the following with two idealized types of communication, as two terms of reference, two coordinate axes, with respect to which real human communication finds its position. So, no concrete scientific communication is a prototype of Scientific Communication (SC) and no concrete poetic communication is a prototype of Poetic Communication (PC). The idealized scientific communication we are concerned with is in fact an idealized type of mathematical communication.

Our base of discussion will be a list of oppositions between SC and PC. Some of them have been proposed long ago, but perhaps we argue about them in a new order of ideas; others are added by us, which were discussed, to a great extent, in some of our previous papers. There is a third class of oppositions which we try to prove are (at least partially) wrong, although many authors assert them.

### *Scientific communication*

- (1) Rational.
- (2) Explicable.
- (3) Lucidity.

### *Poetic communication*

- Emotional
- Ineffable.
- Enchantment.